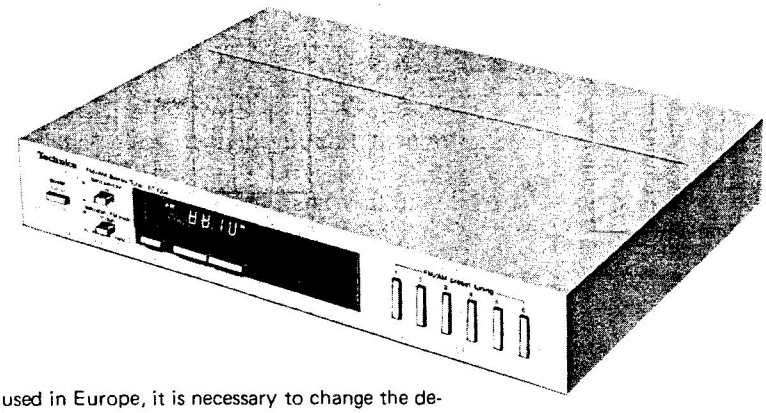
ORDER NO. SD81061918C1

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

ST-C04

[MX], [MC]



* When this unit is used in Europe, it is necessary to change the de-emphasis of MPX output.
(Refer to the Note in the schematic diagram on page 15.)

Areas

* [MX] are available in U.S.A. and Central South America.
* [MC] is available in Canada.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz (0.2 MHz step) 87.50~108.00 MHz (0.05 MHz step)
Sensitivity	11.2 dBf (2.0 μV, IHF '58)
50 dB quieting sensitivity	
MONO	17.5 dBf (4.1 μV IHF '58)
STEREO	39 dBf (49 μV IHF '58)
Total harmonic distortion	
MONO	0.1%
STEREO	0.15%
S/N	
MONO	78 dB
STEREO	73 dB
Frequency response	20 Hz~15 kHz, +0.5 dB, −1.5 dB
Alternate channel selectivity	
normal ±400 kHz	60 dB
Capture ratio	1.0 dB
Image rejection at 98.1 MHz	55 dB
IF rejection at 98.1 MHz	80 dB
Spurious response rejection at 98.1 MHz	80 dB
AM suppression	55 dB
Stereo separation	
1 kHz	50 dB
10 kHz	40 dB
Carrier leak	
19 kHz	−35 dB
38 kHz	−35 dB
Antenna terminals	300 ohms (balanced) 75 ohms (unbalanced)

■ AM TUNER SECTION

Frequency range	530~1620 kHz (10 kHz step) 522~1611 kHz (9 kHz step)
Sensitivity (S/N 20 dB)	30 μV, 250 μV/m
Selectivity (±10 kHz)	55 dB
Image rejection at 1000 kHz	45 dB
IF rejection at 1000 kHz	40 dB

■ GENERAL

Output voltage	fixed 0.6V
Power consumption	8W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	297 × 49 × 232 mm (11-11/16" × 1-15/16" × 9-1/8")
Weight	1.8 kg (4.0 lb.)

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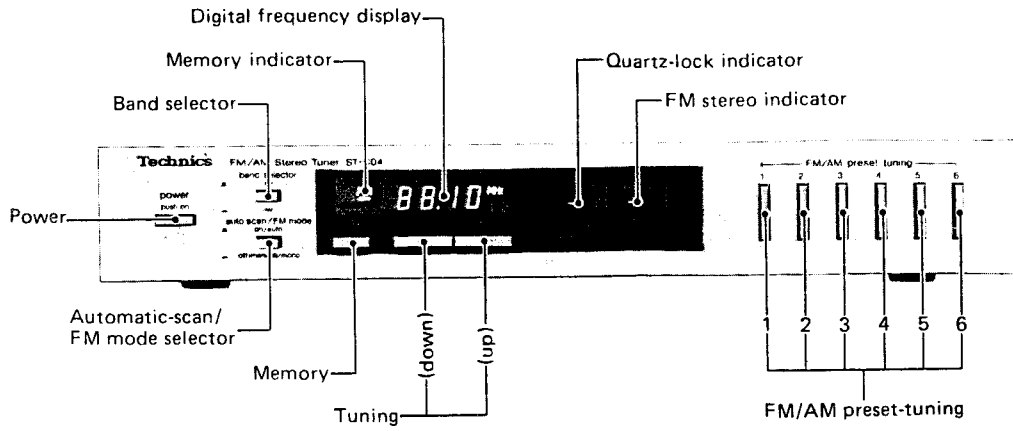
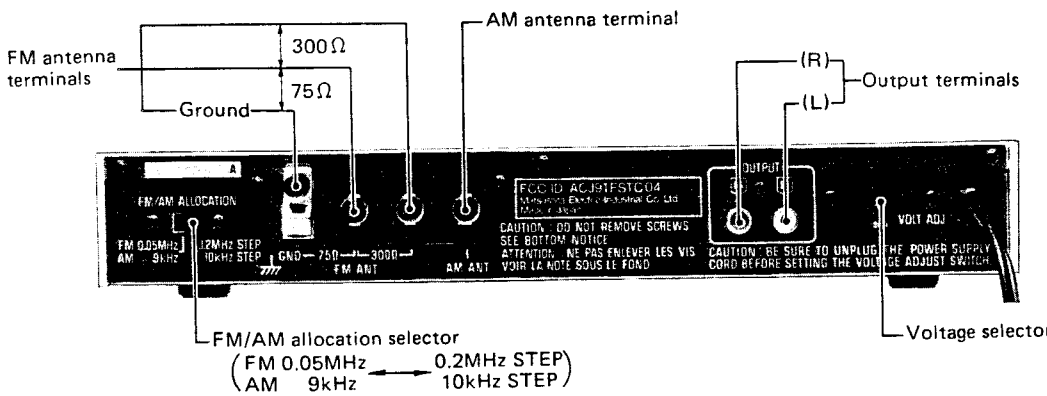
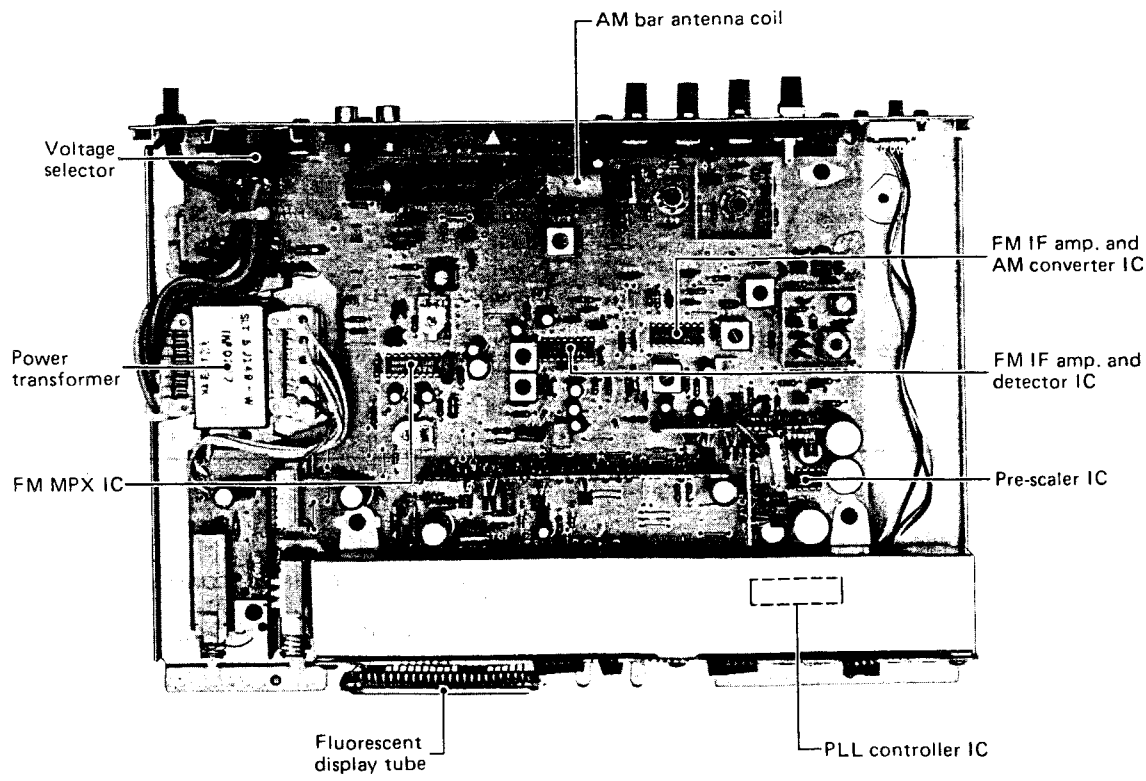
ST-C04

■ LOCATION OF CONTROL

* Since this set is not provided with muting switch, inter-station noise is generated during no-signal mode.







■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet (front panel)

1. Remove the 5 setscrews (Fig. 1: ❶ ~ ❺) of the cabinet.
2. Pull the cabinet toward you and lift it up, holding it by the right and left edges, in the direction of arrow Ⓐ in Fig. 2.

• How to remove the printed circuit board

1. Remove the cabinet.
2. Remove the 2 setscrews (Fig. 1 : ❻ , ❼) of the FM/AM allocation switch, the 2 setscrews (Fig. 1 : ❽ , ❾) of the antenna terminal plate, and the output terminal plate setscrew (Fig. 1 : ❿).
3. Remove the 4 setscrews (Fig. 1: ⓫ and Fig. 3: ⓬ ~ ⓮) of the shielding plate.
4. Remove the 2 setscrews (Fig. 3: ⓯ , ⓰) of the printed circuit board.
5. Lift the printed circuit board and pull it out toward you (in the direction of the arrow Ⓑ in Fig. 3).

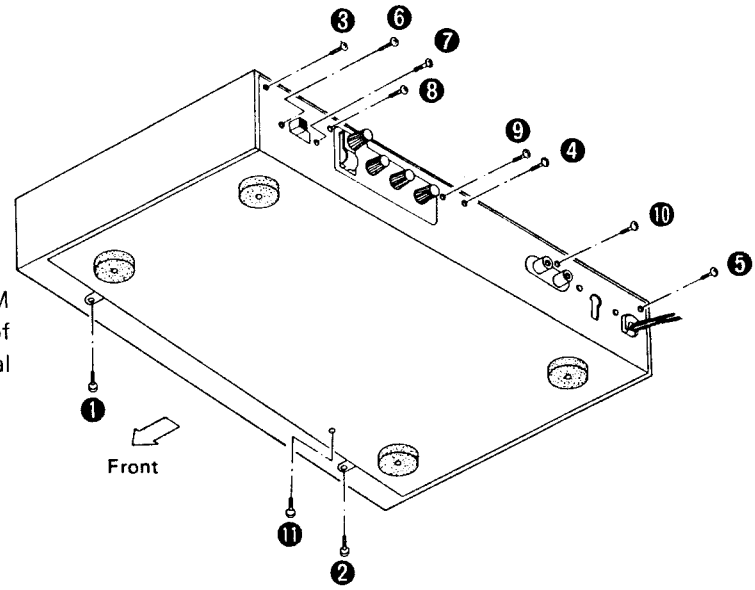


Fig. 1

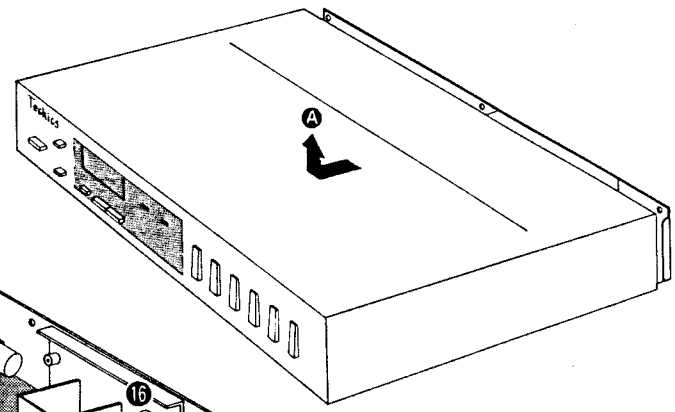


Fig. 2

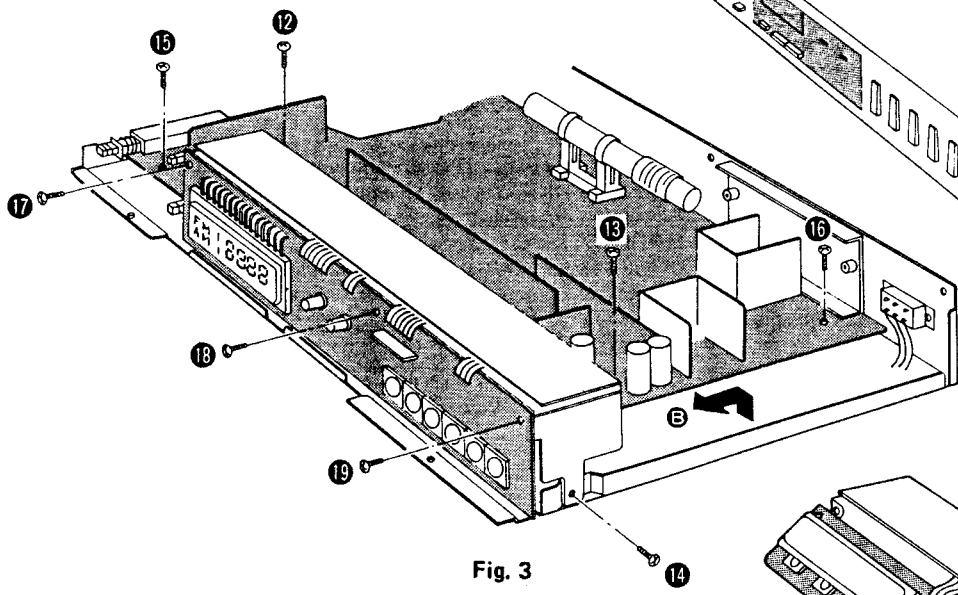


Fig. 3

• How to remove the preset tuning printed circuit board

1. Remove the cabinet.
2. Remove the 3 setscrews (Fig. 3: ⓱ ~ ⓳) of the printed circuit board.
3. Life the printed circuit board to remove it from the chassis grooves (4 portions).
4. Remove the printed circuit board in the direction of the arrow Ⓒ in Fig. 4.
5. When mounting the printed circuit board, completely fit it in the chassis grooves before tightening the setscrews.

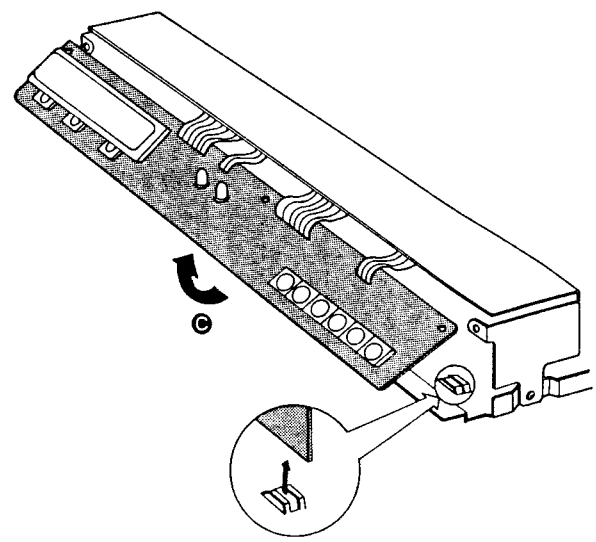


Fig. 4

■ MEASUREMENTS AND ADJUSTMENTS

AM ADJUSTMENT

• Setting and Equipment used

1. AC and DC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Set Band selector to "AM" position.
4. Set FM/AM allocation selector to "0.2 MHz/10 kHz" position.
5. Maintain line voltage at 120 volts.
6. Output of signal generator should be no higher than necessary to obtain an output reading.
7. Use a non-metal screwdriver for the adjustment.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM atnenna terminal through 200pF capacitor. Common to chassis. (Powerful input)	450 kHz (30% Mod. with 400 Hz)	Frequency of non-inter ference	Connect AC VTVM or scope to "OUTPUT" terminals of the set.	T201 (1st 1FT) T202 (2nd 1FT)	Adjust the input frequency and adjustment points so that the output becomes maximum.
	AM-RF ADJUSTMENT					
2	Connect AM-SG to AM antenna terminal through 200pF capacitor Common to chassis. (Weak input)	530 kHz (30% Mod. with 400 Hz)	530 kHz	Connect DC VTVM to TP201 terminal.	L202 (OSC Coil)	Adjust L202 to 1.0V ± 0.05V.
3		610 kHz (30% Mod. with 400 Hz)	610 kHz	Connect AC VTVM or scope to "OUTPUT" terminals of the set.	L201 (ANT Coil)	1. Adjust for maximum output.
4		1500 kHz (30% Mod. with 400 Hz)	1500 kHz	Connect AC VTVM or scope to "OUTPUT" terminals of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output 2. Repeat steps (3) and (4) untill the frequency correctly matches the dial display.

FM ADJUSTMENT

• Equipment used

1. FM signal generator (FM-SG)
2. Stereo modulator (or separation meter)
3. Distortion analyser
4. Oscilloscope
5. AC and DC electronic voltmeters (VTVM)
6. Frequency counter (19 kHz and 108 MHz measurable)
7. FM 300Ω dummy antenna (Fig.5) and low-pass filter (fc : 15 kHz ~ 19 kHz)

• Preparation of FM signal generator (FM-SG)

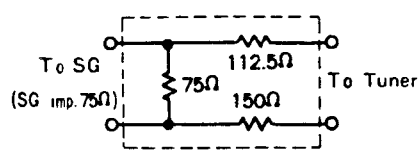
1. Connect stereo modulator to FM-SG.
2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
3. The standard input of the set is 60 dB (1mV), 400 Hz 100% modulation (Because of using dummy antenna, SG output must be 12 dB plus (IHF). That is, when input is 60 dB, SG output is to be 72 dB).

• Setting

1. Set Band selector to "FM" position.
2. Set Automatic-scan/FM mode selector to "off (manual) /mono position.
3. Other setting are the same as in AM adjustment.

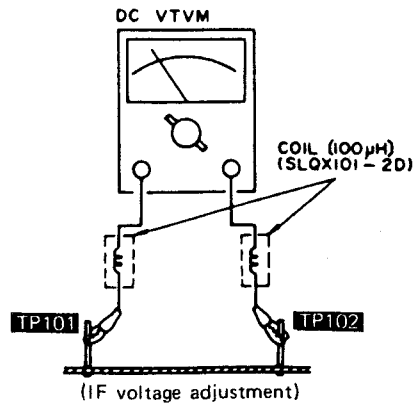
Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM-IF ADJUSTMENT					
5	–	No-Signal	100.1 MHz	Connect DC VTVM to between TP101 and TP102 through choke coil. (Refer to Fig. 6)	T101 (Discri. IFT)	Adjust T101 core so that voltage measured in signal mode is 0V in 300mV range.
	FM-RF ADJUSTMENT					
6	–	No-Signal	87.9 MHz	Connect DC VTVM to TP1 terminal.	L5 (OSC Coil)	Adjust L5 (OSC Coil) to 3.0 ± 0.1V.
7	Connect FM-SG to through 300Ω FM dummy antenna.	90.1 MHz (100% Mod. with 400 Hz) weak input	90.1 MHz	Connect scope to "OUTPUT" terminals of the set.	L2 (RF DET Coil) L1 (ANT Coil) T1 (FM IFT)	1. Add weak input so that noise is included in the output wave form. 2. Make the adjustment so that the output wave form is vertically symmetrical. (Refer to Fig. 7.) 3. Repeat the steps (7) and (8) until the frequency correctly matches the dial display. 4. Check step (6) and if it is deflected readjust of L5.
8		106.1 MHz (100% Mod. with 400 Hz) weak input	106.1 MHz	Connect scope to "OUTPUT" terminals of the set.	CT1 (OSC Trimmer)	

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM MONO DISTORTION ADJUSTMENT					
9	Connect FM-SG to FM antenna terminal through 300Ω FM dumny antenna.	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect distortion analyser to "OUTPUT" terminals of the set.	T102 (Discri. IFT)	1. Check step (5) and if it is deflected, readjust of T101. 2. Adjust T102 core so that distortion of right and left channels are minimized.
	FM MPX PILOT (VCO) ADJUSTMENT					
10	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.1 MHz (Non-modulated)	100.1 MHz	Connect frequency counter to TP301 terminal.	VR301 (VCO)	1. Set the Automatic-scan/FM mode selector to "on/auto". 2. Adjust VR301 to 19 kHz ±30 Hz.
	STEREO DISTORTION ADJUSTMENT					
11	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.1 MHz (100% Mod. with 400 Hz) (L mode)	100.1 MHz	Connect distortion analyser "OUTPUT" terminals of the set, through low-pass filter. (fc=15 kHz ~ 10 kHz)	T1 (IFT)	1. Set the Automatic-scan/FM mode selector to "on/auto". 2. Re-adjust the already adjusted T1 within ±90° from the preset core position so that the distortion of L ch is minmized. 3. Re-check the steps 5, 6, 7, 8 and 9.
	SEPARATION ADJUSTMENT					
12	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.1 MHz (100% Mod. with 1 kHz) (L or R mode)	100.1 MHz	Connect AC VTVM to "OUTPUT" terminals of the set through low-pass filter. (fc = 15 kHz ~ 19kHz)	VR302	1. Set the Automatic-scan/FM mode selector "on/auto". 2. Adjust VR302 so that R output is minimized when stereo modulator is in L (L ch modulation) mode and that L output is minimized in R mode.
	QUARTZ LOCK INDICATOR ADJUSTMENT					
13	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.1 MHz (100% Mod, with 400 Hz)	100.1 MHz	–	R119	1. By controlling the input level, make sure that the indicator lights at the level from 5 to 19 dB. 2. If the indicator does not light, cut off R119.
	AUTOMATIC-SCAN ADJUSTMENT					
14	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	–	R123	1. Set the Automatic-scan/FM mode selector to "on/auto". 2. Setting the input level at 22 dB, depress the tuning button (Up or Down) for auto-scanning and make sure that no auto-stop is made at 100.1 MHz. 3. Then change the input level to 37 dB and make sure that auto-stop functions. If not, cutt off R123.



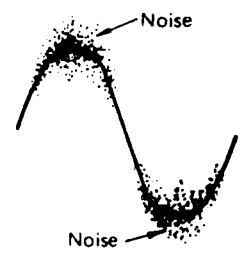
300Ω FM Dummy Antenna

Fig. 5



(IF voltage adjustment)

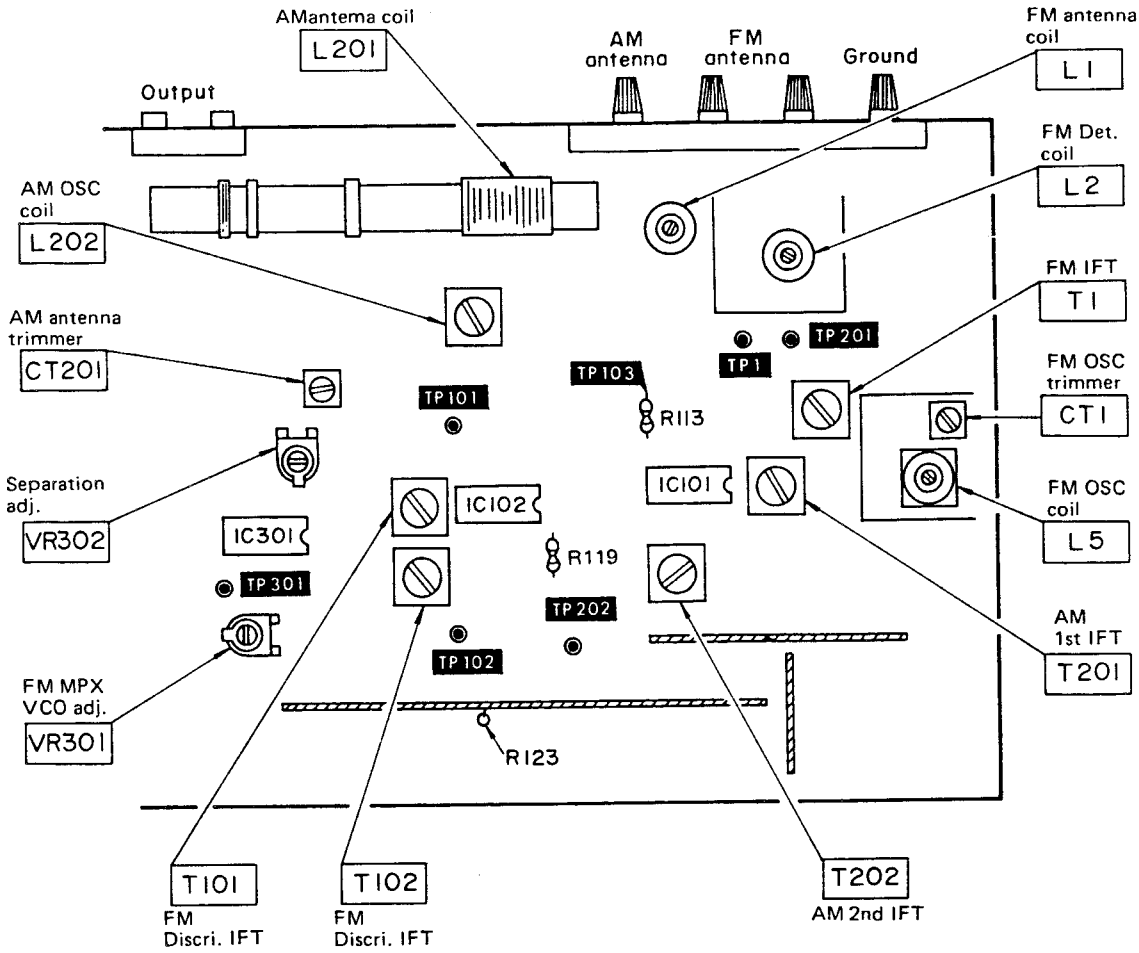
Fig. 6



(AF output wave form)

Fig. 7

■ ADJUSTMENT POINTS



■ PRECAUTIONS FOR REPAIR

- **Before start repairing**

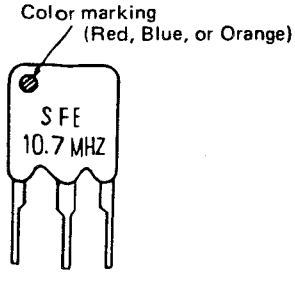
The power switch of this machine is provided at the secondary side of the power transformer. Before proceeding to repair, be sure to pull out the power cord from the plug socket.

For repairing of the micro-computer system, also make sure to discharge the hazardous voltage in advance by shorting both poles of the capacitors (C905 to 907) with a resistor (about 10 ohm, 1W).

- **Use of ceramic filters in pairs**

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three ranks. For this machine, be sure to use the ceramics of the same rank in a pair.

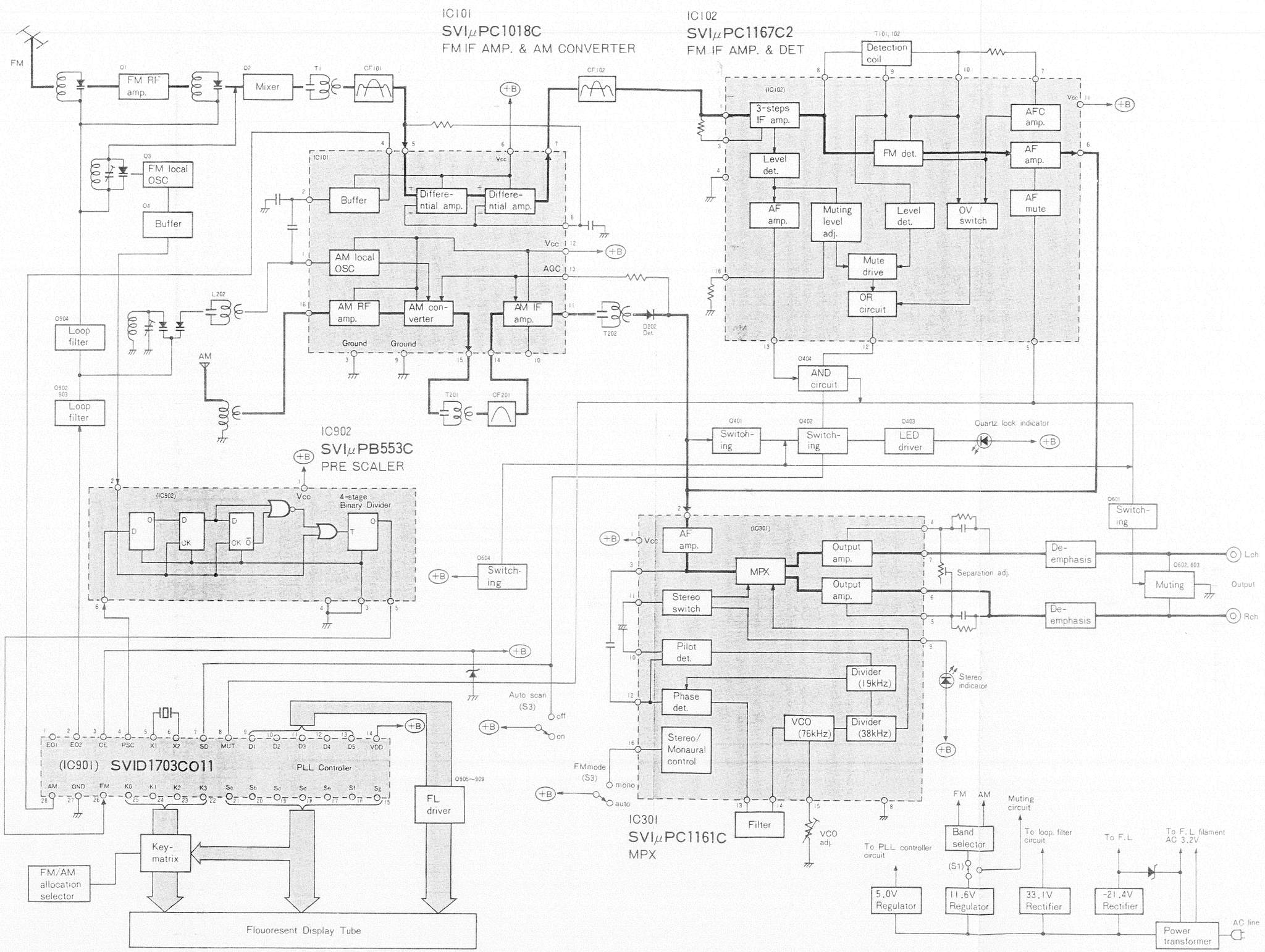
At repairing and replacement, pay close attention to the diodes (D919, D920) for use as different diodes must be used depending on each rank of the ceramic filters.



Rank (Color)	D919	D920
Red	X	X
Orange	O	O
Blue	X	O

Note: O Mark ——► Diode is used.
X Mark ——► Diode is not used.

■ BLOCK DIAGRAM



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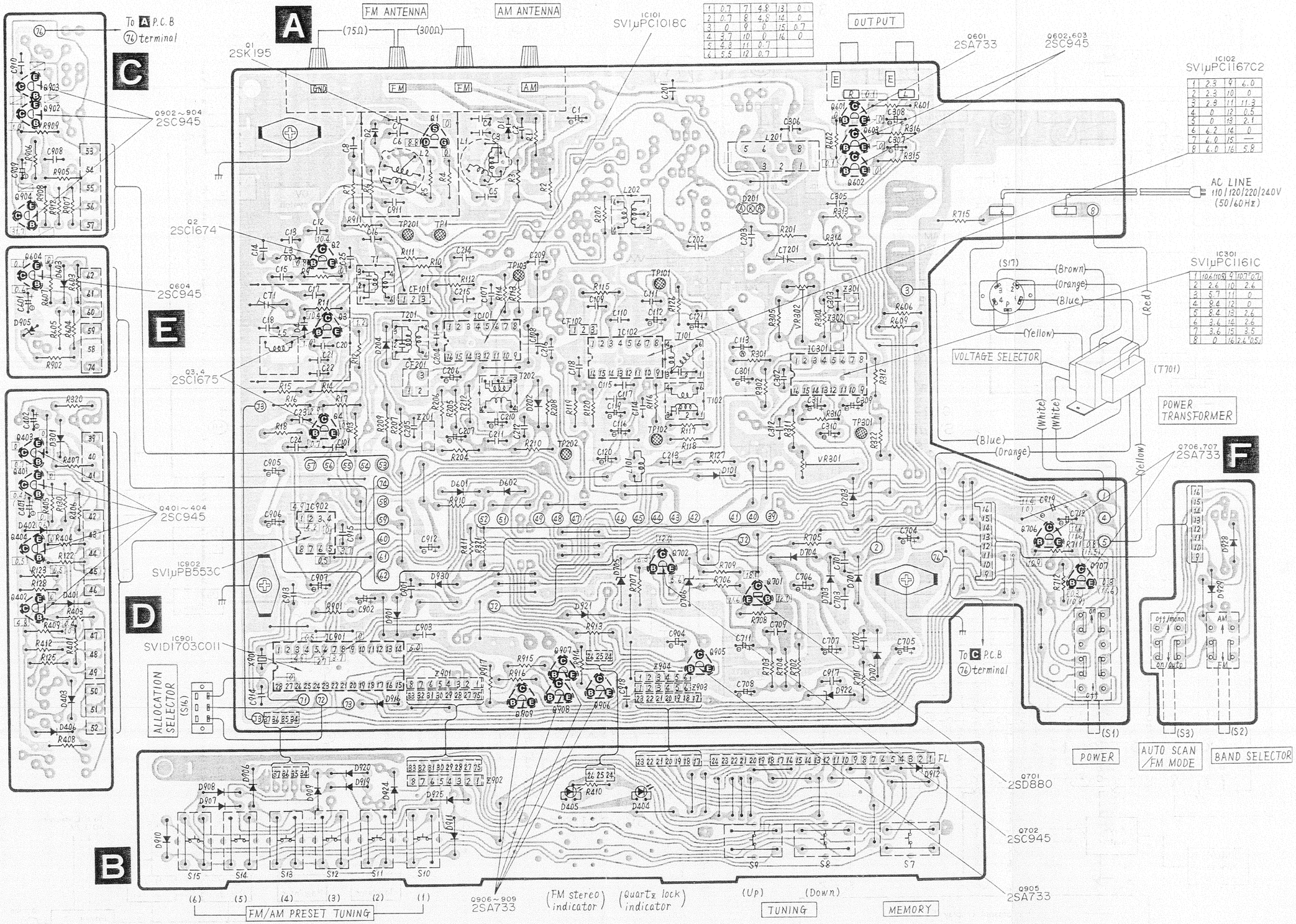
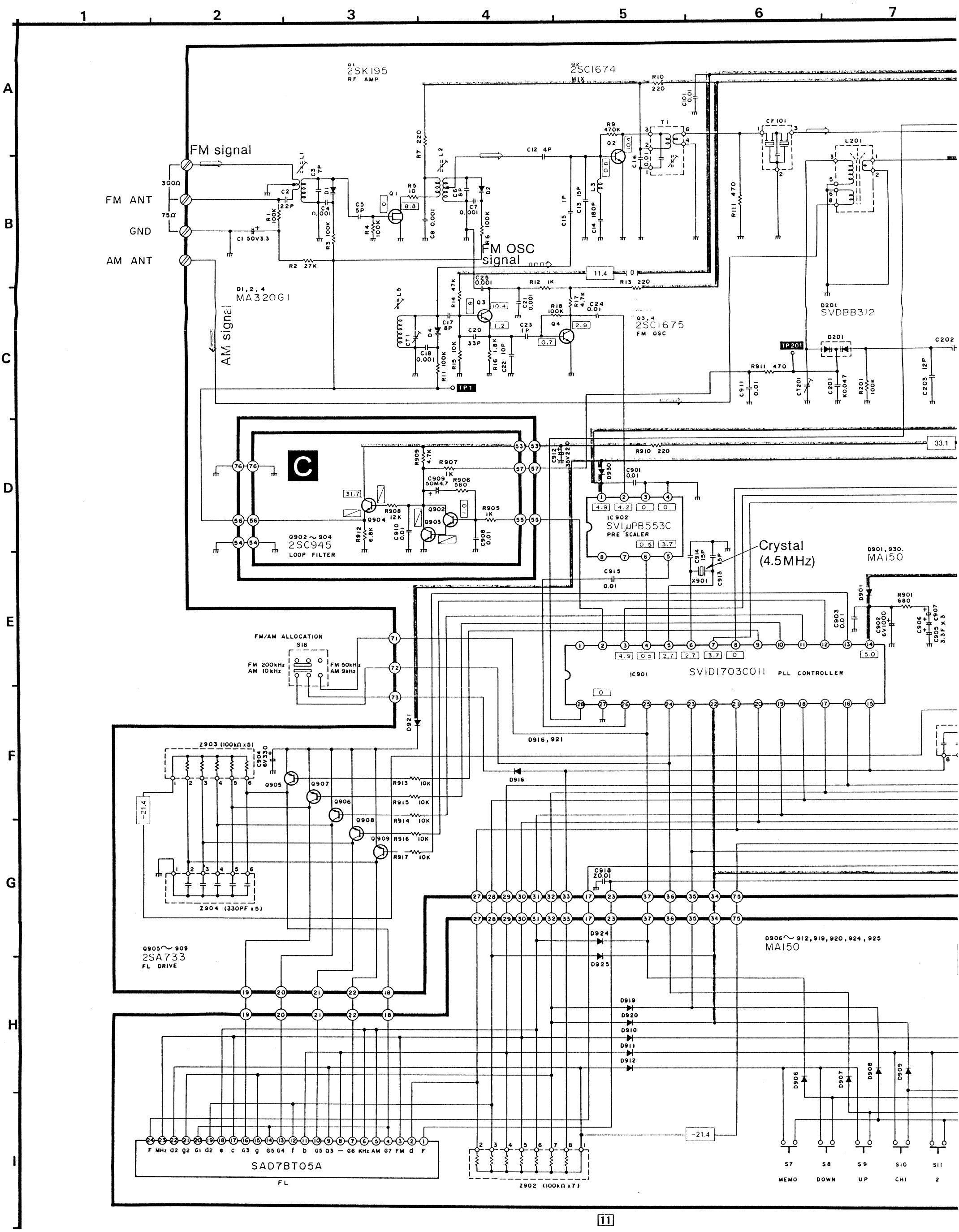
■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines




Q1 2SK195 RF AMP
Q2 2SC1674 MIX
FM signal
FM ANT
GND
AM ANT
300Ω
75Ω
AM signal
D1,2,4 MA320G1
FM OSC signal
Q3,4 2SC1675 FM OSC
D201 SVDBB312
TP1
TP201
Q902~904 2SC945 LOOP FILTER
IC902 SVIμPB553C PRE SCALER
Crystal (4.5MHz)
D901,930. MA150
FM/AM ALLOCATION S16
FM 200kHz AM 10kHz
FM 50kHz AM 9kHz
IC901 SVID1703C011 PLL CONTROLLER
D916,921
Z903 (100kΩ x5)
Z904 (330PF x5)
Q905~909 2SA733 FL DRIVE
SAD7BT05A FL
Z902 (100kΩ x7)
D906~912,919,920,924,925 MA150
S7 MEMO
S8 DOWN
S9 UP
S10 CH↑
S11 2

8 9 10 11 12 13 14

11.6

AM OSC signal

TP103 R112 560 R114 390 CF102 C214 15P C215 0.001 C216 0.01 C107 0.01 R113 1K C108 0.01

IC101 SVIμPC1018C

FM IF & AM COV

0.7 0.7 0 3.7 4.3 5.5 4.8 4.8

0 0.7 0 0 0.7 0.7 0 0

D202 0A90 DET

C204 0.01 R207 22K C205 22P Z201 T201 CF201 D204 MA150 R206 47K C206 6V47 R204 4.7K

R205 10K T202 C207 16V10 C210 6V33 D202 C212 0.01 R210 5.6K R208 470 0.01 C211

R212 47 R209 820 C209 0.022

TP202

C202 J470P L202 C203 12P R202 1K

TP101 R115 390 C110 0.01 C109 K 0.022 C112 50VI C111 100P R118 15K C113 16V10 R301 39K C121 50V3.3 R126 1M

IC102 SVIμPC1167C2

FM IF DET

2.3 2.3 2.3 0 0 6.2 6.0 6.0

5.8 0 2.1 0.5 11.3 0 6.0

T101 T102 C118 0.01 C117 0.01 C115 0.01 C119 50VI C120 50V0.47 L101 C116 16V10 R116 6.8K C114 0.01 R120 27K R119 270K

TP102

D101, 203, 602 MA150

C213 K0.033

11.4

(11.5) 0.8

33.1

A

C906 C905 C907 3.3F x 3

Z901 (330PF x 7)

-21.4

R411 1K

5.6

4.9

33.1

B

D404, 405 LN21CPH

R410 10K

D404 QUARTZ LOCK

D405 STEREO

S11 2 S12 3 S13 4 S14 5 S15 6

R406 33K R402 82K D402 R123 100K D401 R403 15K R412 22K R407 120K

0.5 0.4 Q404

R408 100K R123 R128 47K 270K

D406 R409 12K 0.7 4.8 Q403

R404 6.8K (0.6) 0 0.4 Q401 Q402

C401 16V10 R405 18K R130 18K C402 6V33

R902 100K D603 R607 10K R603 3.3K R604 330K Q604 0.6 0.1

D905 SVDMZ3046

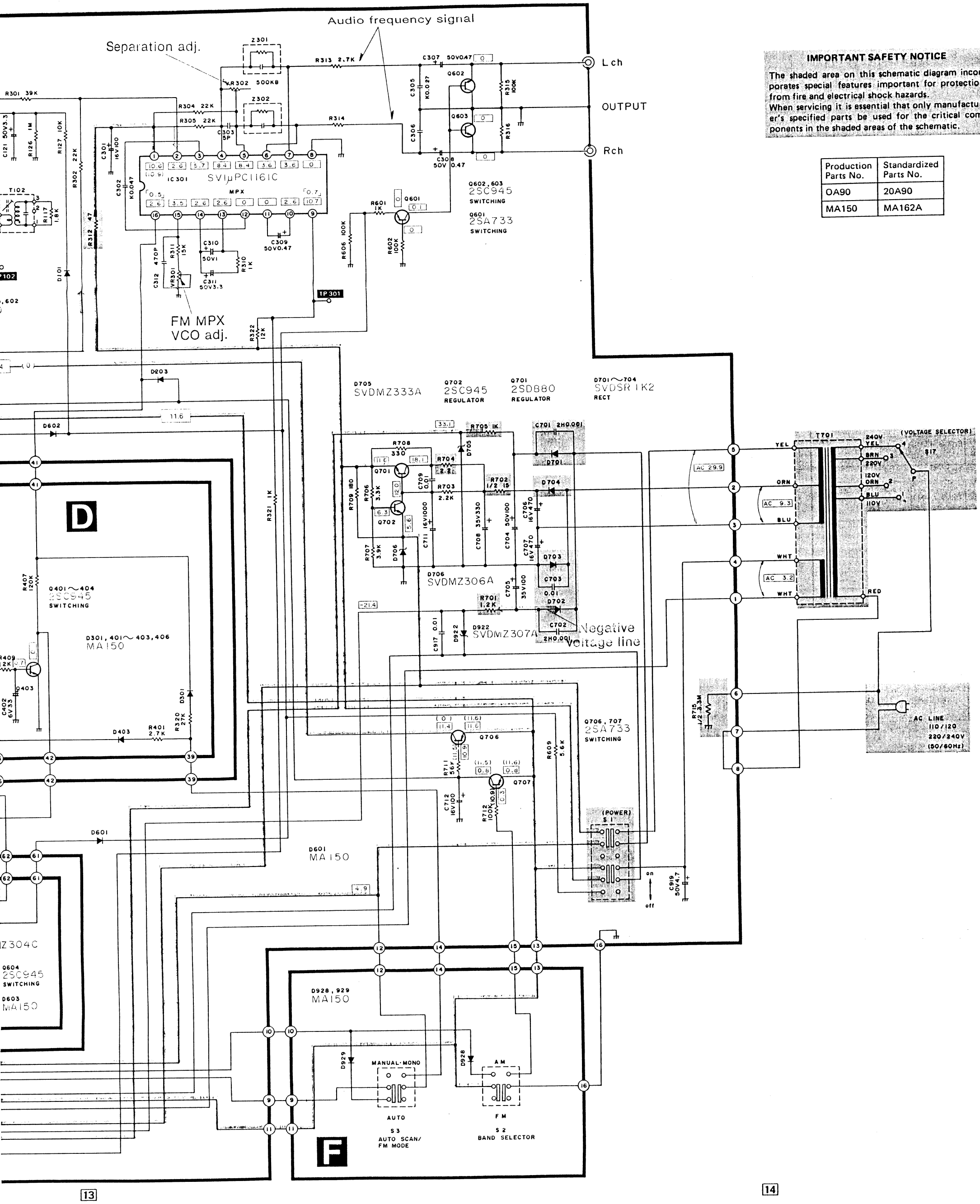
R605 33K C601 6V33 D905

Q604 2SC94 SWITCHIN

D603 MA15

E

12



IMPORTANT SAFETY NOTICE

The shaded area on the schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

Production Parts No.	Standardized Parts No.
OA90	20A90
MA150	MA162A

IMPORTANT SAFETY NOTICE

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nts in the shaded areas of the schematic.

Production Parts No.	Standardized Parts No.
OA90	20A90
MA150	MA162A

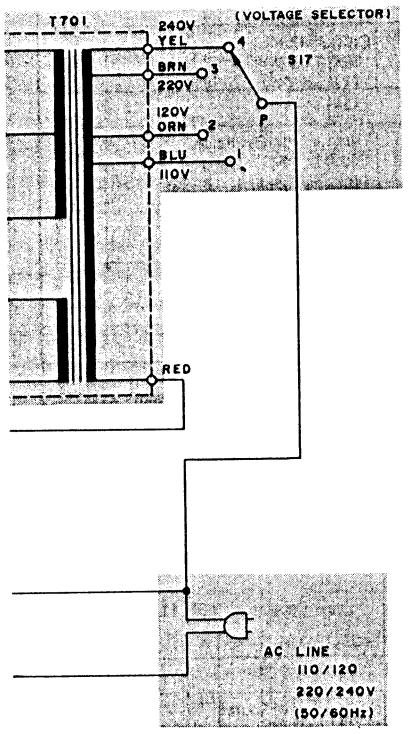
■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

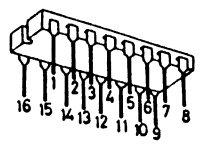
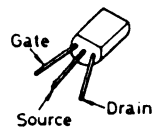
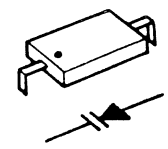
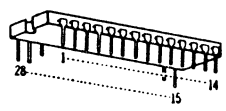
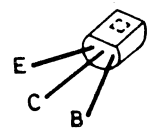
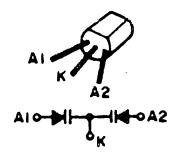
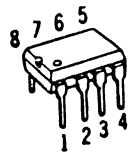
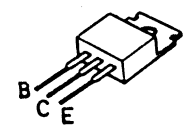
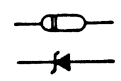
Notes:

1. **S1:** Power switch in "**on**" position.
2. **S2:** Band selector switch in "**FM**" position.
   FM◄——►AM
3. **S3:** Automatic scan/FM mode selector switch in "**on/auto**" position.
   on/auto◄——►off (manual)/mono
4. **S7:** Memory switch in no push condition.
5. **S8:** Tuning (down) switch in no push condition.
6. **S9:** Tuning (up) switch in no push condition.
7. **S10 ~ S15 :** FM/AM preset-tuning switch in no push condition.
8. **S16:** FM/AM allocation selector switch in "**FM 0.2MHz/AM 10kHz**" position.
   FM 0.2MHz/AM 10kHz◄—►FM 0.05MHz/AM 9kHz
9. **S17:** Voltage selector switch in "**240V**" position.
   ①110V—②120V—③220V —④240V
10. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figure in ▭ stand for DC voltage in FM/AM signal reception mode.
    * Figure in ⌐ ⌙ stand for DC voltage in FM stereo signal reception mode.
    * Figure in ( ) stand for DC voltage with the FM/AM selector circuit set at AM.
11. Transistor and IC terminals with carry no voltage indication emit 5V pulse waveforms or are subject to change according to the frequency or input signal levels.
12. Signal lines
    ⟹ FM signal ➡ AM signal
    Audio frequency signal
    Positive voltage lines
13. When using this unit in Europe, change the resistors and capacitors of the de-emphasis circuit as follows:

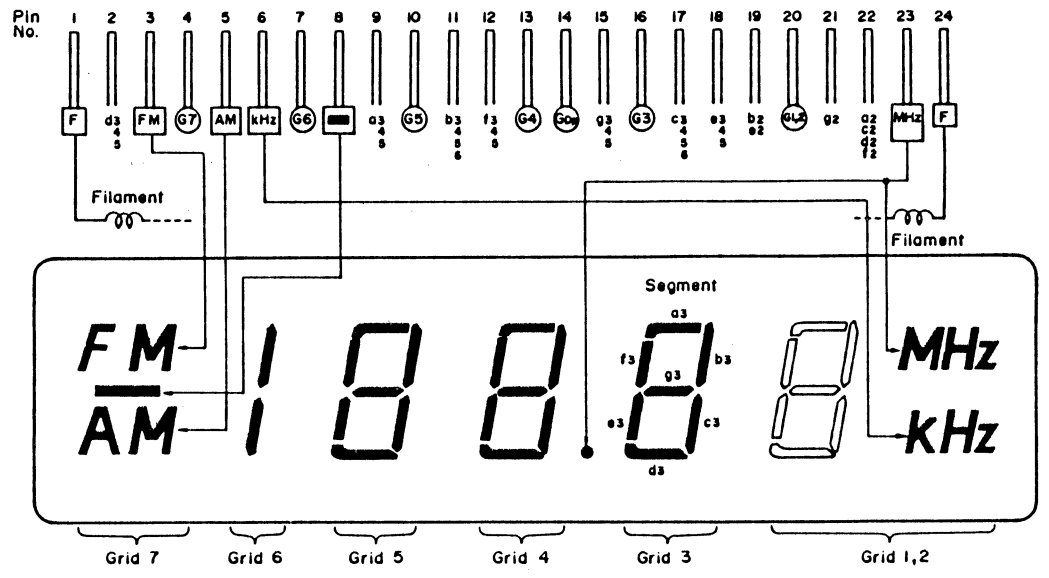
R313, 314	2.7kΩ	⟶ 3.3kΩ
R315, 316	100kΩ	⟶ 33kΩ
C305, 306	0.027μF	⟶ 0.015μF



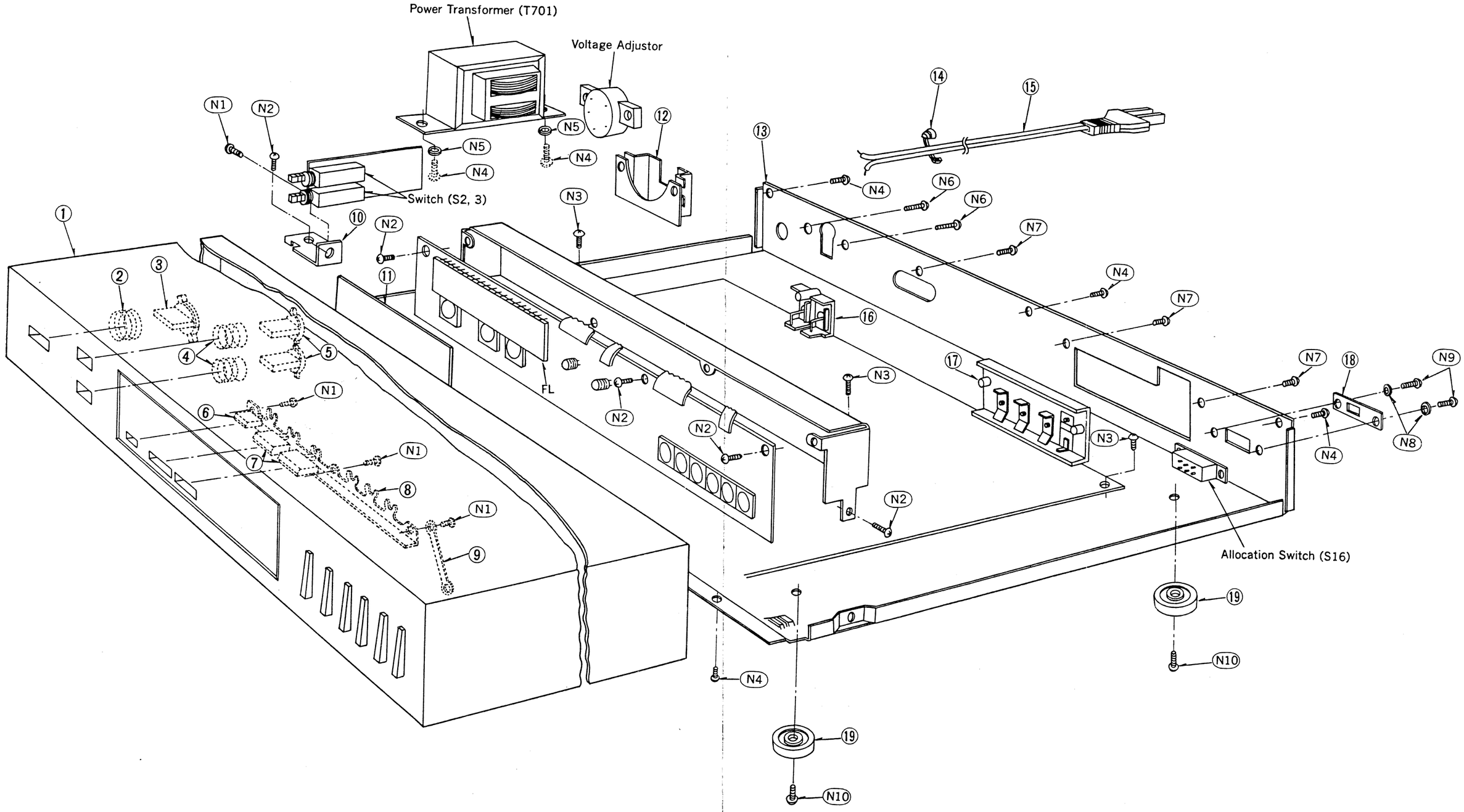
• Terminal guide of transistors, diodes and IC's

SVIμPC1018C SVIμPC1167C SVIμPC1161C 	2SK195 	MA320G1 
SVID1703C011 	2SA733, 2SC945 2SC1674, 2SC1675 	SVDBB312 
SVIμPB553C 	2SD880 	SVDMZ□□□□ 

• Flurorescent Display Tube



■ EXPLODED VIEW



Printed in Japan
81064750 Ⓗ AM/TN

■ REPLACEMENT PARTS LIST ..... Cabinet and Chassis Parts

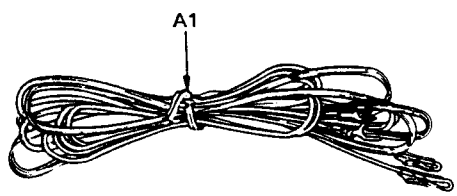
Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

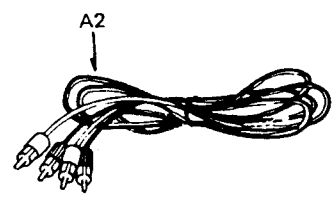
Areas

* [MX] are available in U.S.A. and Central South America.
* [MC] are available in Canada.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SGWTC04MX	Front Panel Ass'y
2		SUS187	Spring, Button
3		SBC411	Button, Power Switch
4		SUS213–1	Spring, Button
5		SBC287	Button, Band Selector, Auto Scan/FM Mode
6		SBC403	Button, Memory
7		SBC405	Button, Tuning
8		SUS237	Spring, Button
9		SUS247	Spring, Button
10		SUW1799	Bracket, Switch PCB
11		SHR5129	Filter, FL
12		SMN1635	Bracket, Voltage Adjustor Switch
13 [MX] only		SGPTC04MX	Rear Panel Ass'y
13 [MC] only		SGPTC04C	Rear Panel Ass'y
14		RHR111	Bushing, AC Cord
15	⚠	**RJA9Y**	AC Cord
16		SJF3207–5N	Terminal Board, Output
17		SJF4419–4	Terminal Board, Antenna
18		SHR5073–1	Cover, Allocation Switch
19		SKL265	Foot
SCREWS and WASHERS			
N1		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N2		**XTB3+8BFN**	Screw, Tapping, ⊕ 3 x 8
N3		XTBS3+8BFZ1	Screw, Tapping with Detent, ⊕ 3 x 8
N4		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N5		**XWG3FZ**	Washer, Plain, φ3
N6		**XTB3+14BFZ**	Screw, Tapping, ⊕ 3 x 14
N7		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3 x 10
N8		**XWA3BFZ**	Washer, Spring, φ3
N9		**XSN3+6BVS**	Screw, ⊕ 3 x 6
N10		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
ACCESSORIES			
A1		SSA267	Cord, FM Feeder Antenna
A2		SJP2129–5	Cord, Stereo Pin-Type Connection
A3 [MX] only		SQF10795	Instructions Book, Printed Matter
A3 [MC] only		SQF10797	Instructions Book, Printed Matter
PACKING PARTS			
P1		SPP691	Polyethylene Bag
P2		SPS3231	Pad, Left Side
P3		SPS3233	Pad, Right Side
P4 [MX] only		SPG3185	Carton Box
P4 [MC] only		SPG3187	Carton Box

• Accessories





Ref. No.		Part No.	Part Name & Description
R204		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R205		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R206		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R207		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R208		**ERD25FJ471**	Carbon, 1/4W, 470Ω, ± 5%
R209		**ERD25FJ821**	Carbon, 1/4W, 820Ω, ± 5%
R210		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R212		**ERD25FJ470**	Carbon, 1/4W, 47Ω, ± 5%
R301		**ERD25TJ393**	Carbon, 1/4W, 39kΩ, ± 5%
R302		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R304, 305		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R310		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R311		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ± 5%
R312	△	**ERD25FJ470**	Carbon, 1/4W, 47Ω, ± 5%
R313, 314		**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ± 5%
R315, 316		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R320		**ERD25TJ273**	Carbon, 1/4W, 27kΩ, ± 5%
R321		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R322		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R401		**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ± 5%
R403		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ± 5%
R404		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R405		**ERD25TJ183**	Carbon, 1/4W, 18kΩ, ± 5%
R406		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R407		**ERD25TJ124**	Carbon, 1/4W, 120kΩ, ± 5%
R408		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R409		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R410		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R411		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R412		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R601		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R602		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R603		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R604		**ERD25TJ334**	Carbon, 1/4W, 330kΩ, ± 5%
R605		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R606		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R607		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R609		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R701	△	**ERD25FJ122**	Carbon, 1/4W, 1.2kΩ, ± 5%
R702	△	**ERQ12HJ150**	Fuse Type Metallic, 1/2W, 15Ω, ± 5%
R703		**ERD25FJ222**	Carbon, 1/4W, 2.2kΩ, ± 5%
R704	△	**ERD25FJ2R2**	Carbon, 1/4W, 2.2Ω, ± 5%
R705	△	**ERD50FJ102**	Carbon, 1/2W, 1kΩ, ± 5%
R706		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R707		**ERD25FJ392**	Carbon, 1/4W, 3.9kΩ, ± 5%
R708		**ERD25FJ331**	Carbon, 1/4W, 330Ω, ± 5%
R709		**ERD25FJ181**	Carbon, 1/4W, 180Ω, ± 5%
R711		**ERD25TJ563**	Carbon, 1/4W, 56kΩ, ± 5%
R712		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R715	△	**ERC12ZGK335**	Solid, 1/2W, 3.3MΩ, ± 5%
R901		**ERD25FJ681**	Carbon, 1/4W, 680Ω, ± 5%
R902		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R905		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R906		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ± 5%
R907		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R908		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R909		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R910		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R911		**ERD25FJ471**	Carbon, 1/4W, 470Ω, ± 5%
R912		**ERD50FJ682**	Carbon, 1/2W, 6.8kΩ, ± 5%
R913, 914		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R915, 916		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R917		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%

CAPACITORS

C1	**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF	
C2	ECCD1H220K	Ceramic, 50V, 22pF,	± 10%
C3	ECCD1H070DC	Ceramic, 50V, 7pF,	± 0.5pF
C4	ECKD1H102ZF	Ceramic, 50V, 0.001μF,	+ 80% − 20%
C5	ECCD1H050C	Ceramic, 50V, 5pF,	±0.25pF
C6	ECCD1H080DC	Ceramic, 50V, 8pF,	± 0.5pF
C7, 8	ECKD1H102ZF	Ceramic, 50V, 0.001μF,	+ 80% − 20%
C10	ECKD1H103ZF	Ceramic, 50V, 0.01μF,	+ 80% − 20%
C12	ECCD1H040CC	Ceramic, 50V, 4pF,	±0.25pF

Ref. No.		Part No.	Part Name & Description
C13		ECCD1H150KC	Ceramic, 50V, 15pF, ± 10%
C14		ECCD1H181K	Ceramic 50V, 180pF, ± 10%
C15		ECCD1H010CC	Ceramic, 50V, 1pF, ±0.25pF
C16		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C17		ECCD1H080DC	Ceramic, 50V, 8pF, ± 0.5pF
C18		ECKD1H102ZF	Ceramic, 50V, 0.001μF, + 80% − 20%
C20		ECCD1H330KC	Ceramic, 50V, 33pF, ± 10%
C21		ECKD1H102ZF	Ceramic, 50V, 0.001μF, + 80% − 20%
C22		ECCD1H100KC	Ceramic, 50V, 10pF, ± 10%
C23		ECCD1H010CC	Ceramic, 50V, 1pF, ±0.25pF
C24		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C25		ECKD1H102ZF	Ceramic, 50V, 0.001μF, + 80% − 20%
C101		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C107, 108		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C109		ECQM1H223KZ	Polyester, 50V, 0.022μF, ± 10%
C111		ECCD1H101K	Ceramic, 50V, 100pF, ± 10%
C112		**ECEA50Z1**	Electrolytic, 50V, 1μF
C113	△	**ECEA16N10**	Electrolytic, 16V, 10μF
C114, 115		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C116		**ECEA1HS100**	Electrolytic, 50V, 10μF
C117, 118		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C119		**ECEA50Z1**	Electrolytic, 50V, 1μF
C120		**ECEA50ZR47**	Electrolytic, 50V, 0.47μF
C121		**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF
C201		ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C202		ECQP1471JZ	Polypropylene, 100V, 470pF, ± 5%
C203		ECCD1H120KC	Ceramic, 50V, 12pF, ± 10%
C204		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C205		ECCD1H220K	Ceramic, 50V, 22pF, ± 10%
C206		**ECEA1AS470**	Electrolytic, 10V, 47μF
C207		**ECEA1HS100**	Electrolytic, 50V, 10μF
C209		ECKD1H223ZF	Ceramic, 50V, 0.022μF, + 80% − 20%
C210		**ECEA1CS330**	Electrolytic, 16V, 33μF
C211, 212		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C213		ECQM1H333KZ	Polyester, 50V, 0.033μF, ± 10%
C214		ECCD1H150KC	Ceramic, 50V, 15pF, ± 10%
C215		ECKD1H102ZF	Ceramic, 50V, 0.001μF, + 80% − 20%
C216		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C301		**ECEA1ES101**	Electrolytic, 25V, 100μF
C302		ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C303		ECCD1H050C	Ceramic, 50V, 5pF, ±0.25pF
C305, 306		ECQM1H273KZ	Polyester, 50V, 0.027μF, ± 10%
C307, 308		**ECEA50ZR47**	Electrolytic, 50V, 0.47μF
C309		**ECEA50ZR47**	Electrolytic, 50V, 0.47μF
C310		**ECEA50Z1**	Electrolytic, 50V, 1μF
C311		**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF
C312		ECQP1471JZ	Polypropylene, 100V, 470pF, ± 5%
C401		**ECEA1HS100**	Electrolytic, 50V, 10μF
C402		**ECEA1CS330**	Electrolytic, 16V, 33μF
C601		**ECEA1CS330**	Electrolytic, 16V, 33μF
C701, 702	△	ECKD2H102KB	Ceramic, 500V, 0.001μF, ± 10%
C703	△	ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C704		**ECEA1HS101**	Electrolytic, 50V, 100μF
C705		**ECEA1VS101**	Electrolytic, 35V, 100μF
C706, 707		**ECEA1CS471**	Electrolytic, 16V, 470μF
C708		**ECEA1VS331**	Electrolytic, 35V, 330μF
C709		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C711		**ECEA1CS102**	Electrolytic, 16V, 1000μF
C712		**ECEA1ES101**	Electrolytic, 25V, 100μF
C901		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C902		**ECEA0JS102**	Electrolytic, 6.3V, 1000μF
C903		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C904		**ECEA1AS331**	Electrolytic, 10V, 330μF
C905, 906		EECW1R8A3R3S	Electrolytic, 1.8V, 3.3F
C907		EECW1R8A3R3S	Electrolytic, 1.8V, 3.3F
C908		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C909		**ECEA50M4R7R**	Electrolytic, 50V, 4.7μF
C910, 911		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C912		**ECEA1VS221**	Electrolytic, 35V, 220μF
C913, 914		ECCD1H150KC	Ceramic, 50V, 15pF, ± 10%
C915		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C917, 918		ECKD1H103ZF	Ceramic, 50V, 0.01μF, + 80% − 20%
C919		**ECEA50Z4R7**	Electrolytic, 50V, 4.7μF

■ REPLACEMENT PARTS LIST ..... Electric Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.

2. Important safety notice:
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When replacing any of these components, use only manufacturer's specified parts.

Ref. No.		Part No.	Part Name & Description
INTEGTATED CIRCUITS			
IC101		RVIUPC1018CF	IC, FM IF & AM Converter
IC102		SVIUPC1167C2	IC, FM IF Detector
IC301		SVIUPC1161C	IC, MPX
IC901		SVID1703C011	IC, Micro-Computer
IC902		SVIUPB553C–E	IC, Pre-Scaler
TRANSISTORS			
Q1		2SK195–H2	Transistor, FM RF Amplifier
Q2		**2SC1674–M**	Transistor, FM Mixer
Q3, 4		**2SC1675–L**	Transistor, FM Oscillator
Q401 ~ 404 602 ~ 604, 702 902 ~ 904		**2SC945–Q**	Transistor, Switching, Muting Loop Filter
Q601, 706, 707 905 ~ 909		**2SA733–P1**	Transistor, Switching, Muting FL Drive
Q701		2SD880–Y	Transistor, Regulator
DIODES			
D1, 2, 4		MA320G1–N	Diode, Variable Capacitor (for FM)
D101, 203, 204 301, 401 ~ 403 406, 601 ~ 603 901, 906 ~ 912 916, 919 ~ 921 924, 925 928 ~ 930		**MA162A**	Diode, Switching
D201		SVDBB312E	Diode, Variable Capacitor (For AM)
D202		**20A90**	Diode, Detector
D404, 405		LN21CP	Light Emitting Diode
D701 ~ 704	⚠	**SVDSR1K2**	Rectifier
D705		SVDMZ333A	Diode, 33V Zener
D706		SVDMZ306A	Diode, 6V Zener
D905		SVDMZ304C	Diode, 4V Zener
D922		SVDMZ307A	Diode, 7V Zener
COILS and TRANSFORMERS			
L1		SLA4P55–P	Coil, FM Antenna
L2		SLD4P53–P	Coil, FM Detector
L3		RLQY15G5–Y	Coil, Choke
L5		SLO4N21	Coil, FM Oscillator
L101		SLQX101–3M	Coil, Choke
L201		SLF2C31	Coil, AM Bar Antenna
L202		SLO2C29–P	Coil, AM Oscillator
T1		SLI4C109	Transformer, FM IF
T101		SLI4C529–Z	Transformer, FM IF
T102		SLI4C531–Z	Transformer, FM IF
T201		SLI2C127	Transformer, AM IF
T202		SLI2C413R	Transformer, AM IF
T701	⚠	SLT5J149–W	Transformer, Power Source
CERAMIC FILTERS			
CF101		SVFE107MM–A	Ceramic Filter, FM 10.7MHz Red
		SVFE107MM–B	Ceramic Filter, FM 10.68MHz Blue
		SVFE107MM–C	Ceramic Filter, FM 10.72MHz Orange
CF102		SVFE107MZ2–A	Ceramic Filter, FM 10.7MHz Red
		SVFE107MZ2–B	Ceramic Filter, FM 10.675MHz Blue
		SVFE107MZ2–C	Ceramic Filter, FM 10.725MHz Orange (Use pair ranks as same as CF101 and CF102)
CF201		SVFSFP450HT	Ceramic Filter, AM 450kHz
VARIABLE RESISTORS			
VR301		**EVTS3MA00B53**	MPX VCO Adjustment, 5kΩ (B)
VR302		**EVTS3MA00B55**	Separation Adjustment, 500kΩ (B)

Ref. No.		Part No.	Part Name & Description
CRYSTAL			
X901		SVQ43U452	Crystal, 4.5MHz Counter Oscillator
VARIABLE CAPACITORS			
CT1		SVCTY121B269	Trimmer, FM Oscillator
CT201		SVCTY122D221	Trimmer, AM Antenna
FLUORESCENT DISPLAY TUBE			
FL		SAD7BT05A	Fluorescent Display Tube
COMPONENT COMBINATIONS			
Z201		EXRP203Z104T	Component Combination, 0.02μF, 100kΩ
Z301, 302		EXRP181K473T	Component Combination, 180pF, 47kΩ
Z901		EXFP7331MW	Component Combination, 330pF (x 7)
Z902		EXBP87104K	Component Combination, 100kΩ (x 7)
Z903		EXBP85104K	Component Combination, 100kΩ (x 5)
Z904		EXFP5331MW	Component Combination, 330pF (x 5)
LIQUID ELECTROLYTE DOUBLE LAYER CAPACITOR			
C905 ~ 907		EECW1R8A3R3S	Liquid Electrolyte Double Layer Capacitor, 3.3F (1.8V)
SWITCHES			
S1	⚠	SSH1003	Switch, Power Source
S2, 3		SSH1005	Switch, Band Selector, Auto Scan/FM Mode
S7 ~ 15		SSG1	Switch, Memory, Tuning, FM/AM Preset Tuning
S16		ESD14116	Switch, FM/AM Allocation
S17	⚠	ESE372	Switch, Voltage Adjustor

RESISTORS					
R1	**ERD50TJ104**	Carbon,	1/2W,	100kΩ,	± 5%
R2	**ERD50TJ273**	Carbon,	1/2W,	27kΩ,	± 5%
R3, 4	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R5	**ERD25FJ100**	Carbon,	1/4W,	10Ω,	± 5%
R6	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R7	**ERD25FJ221**	Carbon,	1/4W,	220Ω,	± 5%
R9	**ERD25TJ474**	Carbon,	1/4W,	470kΩ,	± 5%
R10	**ERD25FJ221**	Carbon,	1/4W,	220Ω,	± 5%
R11	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R12	**ERD25FJ102**	Carbon,	1/4W,	1kΩ,	± 5%
R13	**ERD25FJ221**	Carbon,	1/4W,	220Ω,	± 5%
R14	**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	± 5%
R15	**ERD25FJ103**	Carbon,	1/4W,	10kΩ,	± 5%
R16	**ERD25FJ182**	Carbon,	1/4W,	1.8kΩ,	± 5%
R17	**ERD25FJ472**	Carbon,	1/4W,	4.7kΩ,	± 5%
R18	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R111	**ERD25FJ471**	Carbon,	1/4W,	470Ω,	± 5%
R112	**ERD25FJ561**	Carbon,	1/4W,	560Ω,	± 5%
R113	**ERD25FJ102**	Carbon,	1/4W,	1kΩ,	± 5%
R114, 115	**ERD25FJ391**	Carbon,	1/4W,	390Ω,	± 5%
R116	**ERD25FJ682**	Carbon,	1/4W,	6.8kΩ,	± 5%
R117	**ERD25FJ182**	Carbon,	1/4W,	1.8kΩ,	± 5%
R118	**ERD25TJ153**	Carbon,	1/4W,	15kΩ,	± 5%
R119	**ERD25TJ274**	Carbon,	1/4W,	270kΩ,	± 5%
R120	**ERD25TJ273**	Carbon,	1/4W,	27kΩ,	± 5%
R122	**ERD25TJ823**	Carbon,	1/4W,	82kΩ,	± 5%
R123	**ERD25TJ274**	Carbon,	1/4W,	270kΩ,	± 5%
R125	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R126	**ERD25TJ105**	Carbon,	1/4W,	1MΩ,	± 5%
R127	**ERD25FJ103**	Carbon,	1/4W,	10kΩ,	± 5%
R128	**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	± 5%
R130	**ERD25TJ183**	Carbon,	1/4W,	18kΩ,	± 5%
R201	**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	± 5%
R202	**ERD25FJ102**	Carbon,	1/4W,	1kΩ,	± 5%

ORDER NO. SD81061965C4

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

ST-C04

[PA], [PE]

Areas

* [PA] is available in for East PX.
* [PE] is available in European Military.

Please use this manual together with the service manual for Model No. ST-C04 [MX, MC] Order No. SD81061918C1.

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No. ST-C04 (ORDER NO. SD81061918C1)	→ ST-C04 [PA], [PE]	Part Name & Description	Per Set (Pcs.)		Remarks
TRANSFORMER						
T701	SLT5J149–W	SLT5J151–W	Transformer, Power Source	1		○
FUSE						
F1	Addition	XBA2C08TR0	Fuse, T 800mA (250V)	1		
RESISTOR						
R715	ERC12ZGK335	Deletion	Solid, 1/2W, 3.3MΩ, ± 10%	0		
CABINET and CHASSIS PARTS						
13	SGPTC04MX [MX] SGPTC04C [MC]	SGPTC04P	Rear Panel Ass'y	1		○
14	RHR111	SHR127	Bushing, AC Cord	1		
15	RJA9Y	RJA52Z	AC Cord	1		
ACCESSORIES						
A3	SQF10795 [MX] SQF10797 [MC]	SQF10801	Instructions Book, Printed Matter	1		○
A4	Addition	RJP120ZBS	Plug Adaptor, AC Power	1		
PACKING						
P4	SPG3185 [MX] SPG3187 [MC]	SPG3189	Carton Box	1		○

Technics

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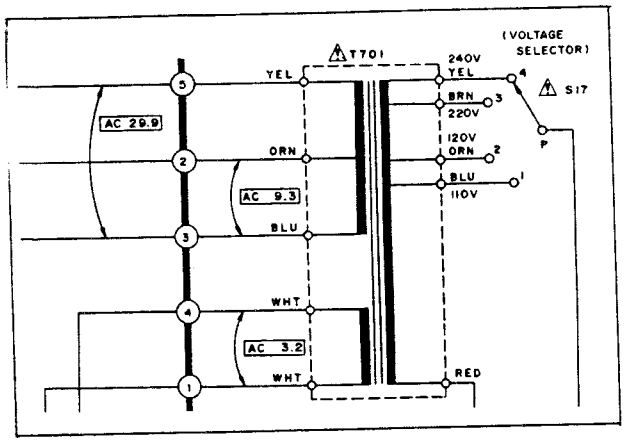
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shiba-koen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

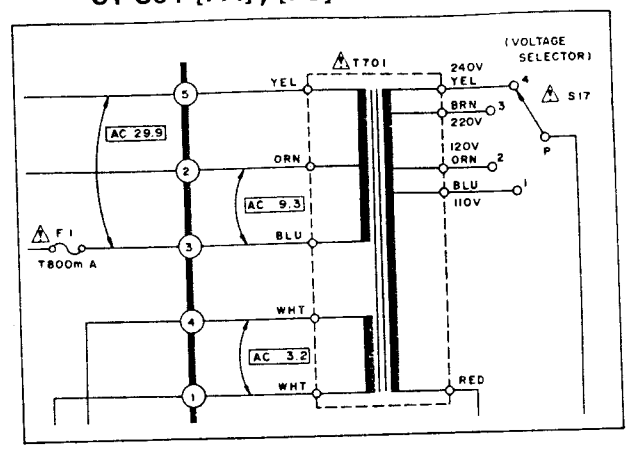
■ SCHEMATIC DIAGRAM

- **Power source circuit**

ST-C04 [MX], [MC]



ST-C04 [PA], [PC]



■ REPLACEMENT PARTS LIST...Cabinet & Chassis Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.

2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SGWTC04MX	Front Panel Ass'y
2		SUS187	Spring, Button
3		SBC411	Button, Power Switch
4		SUS213–1	Spring, Button
5		SBC287	Button, Band Selector, Auto Scan/FM Mode
6		SBC403	Button, Memory
7		SBC405	Button, Tuning
8		SUS237	Spring, Button
9		SUS247	Spring, Button
10		SUW1799	Bracket, Switch PCB
11		SHR5129	Filter, FL
12		SMN1635	Bracket, Voltage Adjustor Switch
13		SGPTC04P	Rear Panel Ass'y
14		SHR127	Bushing, AC Cord
15	⚠	**RJA52Z**	AC Cord
16		SJF3207–5N	Terminal Board, Output
17		SJF4419–4	Terminal Board, Antenna
18		SHR5073–1	Cover, Allocation Switch
19		SKL265	Foot

Ref. No.		Part No.	Part Name & Description
SCREWS and WASHERS			
N1		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N2		**XTB3+8BFN**	Screw, Tapping, ⊕ 3 x 8
N3		XTBS3+8BFZ1	Screw, Tapping with Detent, ⊕ 3 x 8
N4		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N5		**XWG3FZ**	Washer, Plain, ϕ3
N6		**XTB3+14BFZ**	Screw, Tapping, ⊕ 3 x 14
N7		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3 x 10
N8		**XWA3BFZ**	Washer, Spring, ϕ3
N9		**XSN3+6BVS**	Screw, ⊕ 3 x 6
N10		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
ACCESSORIES			
A1		SSA267	Cord, FM Feeder Antenna
A2		SJP2129–5	Cord, Stereo Pin-Type Connection
A3		SQF10801	Instructions Book, Printed Matter
A4	⚠	RJP120ZBS	Plug Adaptor, AC Power
PACKING PARTS			
P1		SPP691	Polyethylene Bag
P2		SPS3231	Pad, Left Side
P3		SPS3233	Pad, Right Side
P4		SPG3189	Carton Box

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ORDER NO. SD81061968S1

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

ST-C04

[MX], [MC]

Supplement

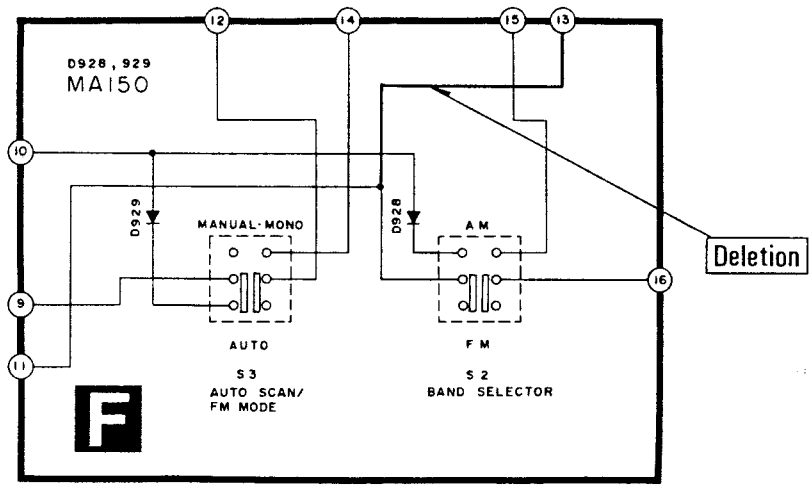
Areas

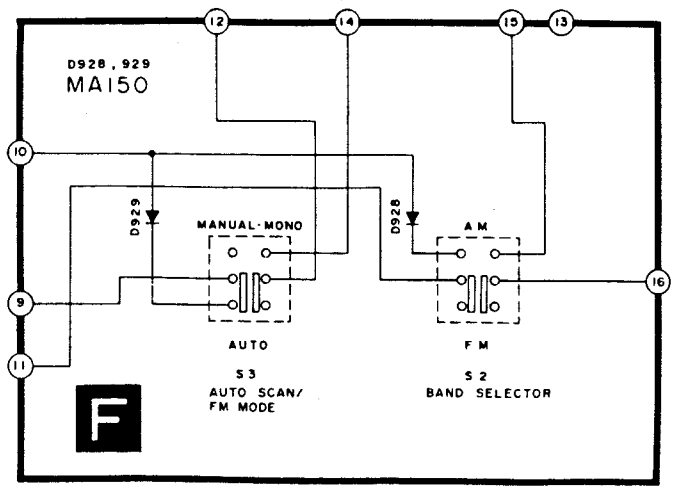
* [MX] is available in U.S.A and Central South America.
* [MC] is available in Canada.

Please use this manual together with the service manual for Model No. ST-C04, Order No. SD81061918C1.

CORRECTION

■ SCHEMATIC DIAGRAM (Page 14)





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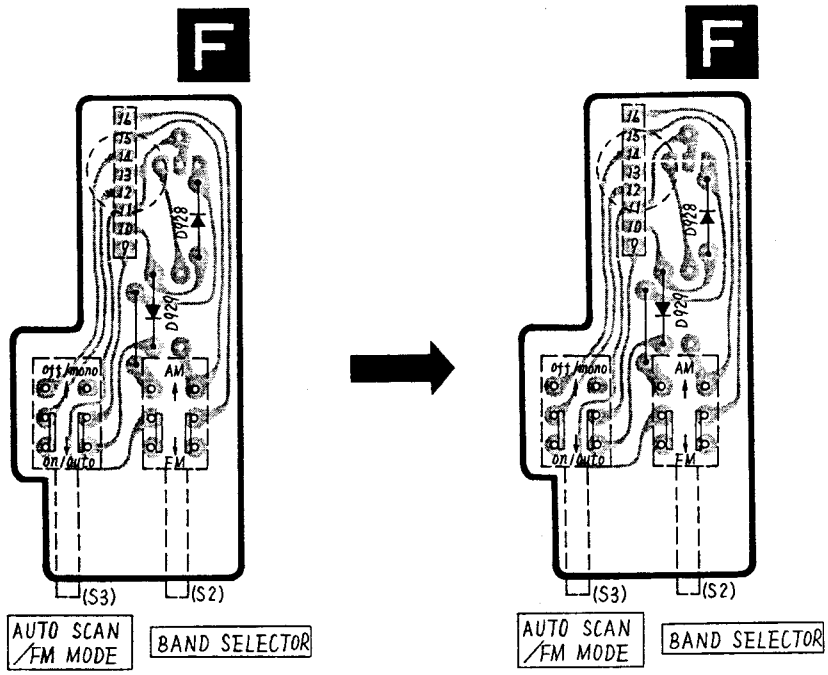
■ PRINTED CIRCUIT BOARD (Page 10)



■ PRECAUTIONS FOR REPAIR (Page 6)

Rank (Color)	D919	D920
Red	X	X
Orange	O	O
Blue	X	O

Note: O Mark ⟶ Diode is used.
X Mark ⟶ Diode is not used.

Rank (Color)	D919	D920
Red	X	X
Orange	X	O
Blue	O	O

Note: O Mark ⟶ Diode is used.
X Mark ⟶ Diode is not used.

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